

**HRS Documentation Record**

**Star Lake Canal, a.k.a. Jefferson Canal  
Port Neches, Jefferson County, Texas  
TX0001414341**

Prepared in cooperation with the

**U.S. Environmental Protection Agency**

Prepared by

**Texas Natural Resource Conservation Commission  
Site Assessment Section  
Site Discovery and Assessment Program Staff  
Austin, Texas**

***July 1999***

The preparation of this report was financed through grants from the U.S. Environmental Protection Agency.



## NATIONAL PRIORITIES LIST (NPL)

July 1999

OSWER/OERR

State, Tribal, and Site Identification Center

Washington, DC 20460

**STAR LAKE CANAL  
Port Neches, Texas**

The Star Lake Canal site is located in Port Neches, Texas, an industrial city adjacent to the Neches River in east Texas. The site consists of contaminated surface water sediments in the Jefferson Canal, Star Lake Canal, and Molasses Bayou. The Jefferson and Star Lake canals have received industrial wastewater and stormwater discharges from local chemical and other manufacturing facilities for a number of years. Although these discharges and other waste disposal activities likely account for the contamination found in the surface water sediments, to date, the Texas Natural Resource Conservation Commission (TNRCC) has been unable to identify one or more specific sources of the contamination.

In response to contamination discovered during dredging in the Jefferson Canal, TNRCC collected sediment samples in 1996 and 1998 from the Jefferson Canal, Star Lake Canal, and wetlands bordering the Molasses Bayou. TNRCC found elevated concentrations of chromium, copper, polynuclear aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs) in the canal sediments and elevated concentrations of copper, PAHs, and pesticides in the Molasses Bayou wetlands.

In the absence of a specific source of contamination, the Star Lake Canal site has been identified as an area of contaminated sediments. The contaminated sediments extend more than 2 miles, spanning portions of Jefferson Canal, Star Lake Canal, and the Molasses Bayou to within ¼-mile of where the Molasses Bayou, Star Lake Canal, and Neches River converge.

More than 3 miles of wetlands front the surface water in which contaminated sediments have been detected. These wetlands are habitats known to be used by the white-faced ibis, a State-designated threatened species. From the confluence of the Molasses Bayou, Star Lake Canal, and Neches River, surface water flows down the Neches River approximately 3½ miles to Sabine Lake. Sabine Lake is used as a fishery and produced more than 1 million pounds of fish and shellfish in 1996.

*[The description of the site (release) is based on information available at the time the site was scored. The description may change as additional information is gathered on the sources and extent of contamination. See 56 FR 5600, February 11, 1991, or subsequent FR notices.]*

# CONTENTS

	Page
HRS Documentation Record Cover Sheet .....	1
HRS Documentation Record .....	2
Worksheet for the HRS Site Score .....	3
Surface Water Overland/Flood Migration Scoresheet .....	4
References .....	6
2.2 Source Characterization .....	11
2.2.1 Source Identification .....	11
2.2.2 Hazardous Substances Associated with a Source .....	13
2.2.3 Hazardous Substances Available to a Pathway .....	17
2.3 Likelihood of Release .....	17
2.4 Waste Characterization .....	17
2.4.1 Selection of Substance Potentially Posing Greatest Hazard .....	17
2.4.2 Hazardous Waste Quantity .....	18
2.4.2.1.1 Hazardous Constituent Quantity .....	18
2.4.2.1.2 Hazardous Waste Stream Quantity .....	18
2.4.2.1.3 Volume .....	18
2.4.2.1.4 Area .....	18
2.4.2.1.5 Hazardous Waste Quantity Value .....	19
3.0 Ground Water Migration Pathway .....	20
3.1.1 Observed Release .....	20
4.0 Surface Water Overland Flow/Flood Migration Pathway .....	21
4.1 Overland Flood Migration Component .....	21
4.1.1.1 Definition of Hazardous Substance Migration Path for Overland /Flood Component .....	21
Definition of Overland Segment and Probable Point of Entry .....	25
Definitions of In-Water Segments .....	25
4.1.2 Drinking Water Threat .....	27
4.1.2.1 Likelihood of Release .....	27
4.1.2.1.1 Observed Release .....	27
Chemical Analysis .....	27
Background Concentration .....	27
Contaminated Samples .....	29
Attribution .....	39

4.0	Surface Water Overland Flow/Flood Migration Pathway (continued)	
	Hazardous Substances Released .....	39
4.1.3	Human Food Chain Threat .....	40
4.1.3.1	Human Food Chain Threat - Likelihood of Release .....	40
4.1.3.2	Human Food Chain Threat Waste Characteristics .....	40
4.1.3.2.1	Toxicity/Persistence/Bioaccumulation .....	40
4.1.3.2.2	Hazardous Waste Quantity .....	41
4.1.3.2.3	Human Food Chain Threat Waste Characteristics Factor Category Value .....	
41		
4.1.3.3	Human Food Chain Threat - Targets .....	42
4.1.3.3.1	Food Chain Individual .....	42
4.1.3.3.2	Population .....	42
4.1.3.3.3	Calculation of Human Food Chain Threat Factor Category Value ....	42
4.1.3.4	Calculation of Human Food Chain Threat Score for a Watershed ....	42
4.1.4	Environmental Threat .....	43
4.1.4.1	Environmental Threat - Likelihood of Release .....	43
4.1.4.2	Environmental Threat - Waste Characteristics .....	43
4.1.4.2.1	Ecosystem Toxicity/Persistence/Bioaccumulation .....	43
4.1.4.2.2	Hazardous Waste Quantity .....	44
4.1.4.2.3	Environmental Threat Waste Characteristics Factor Category Value ..	44
4.1.4.3	Environmental Threat Targets .....	45
4.1.4.3.1	Sensitive Environments .....	45
4.1.4.3.1.1	Level I Concentrations .....	45
4.1.4.3.1.2	Level II Concentrations .....	45
4.1.4.3.1.3	Potential Contamination .....	45
4.1.4.3.1.4	Calculation of Environmental Threat Targets Factor Category Value .	46
4.1.4.4	Calculation of Environmental Threat Score for a Watershed .....	46
5.0	Soil Exposure Pathway .....	47
5.1.1	Observed Release .....	47
6.0	Air Migration Pathway .....	48
6.1.1	Observed Release .....	48

## TABLES

1. Source Description - Contaminated Sediment Samples .....	13
2. Hazardous Waste Quantity Value .....	19
3. Highest Organic and Inorganic Background Concentrations .....	28
4. Contaminated Sediment Samples .....	29
5. Data Usability .....	38
6. Hazardous Substance Toxicity, Persistence, Bioaccumulation Potential .....	40
7. Hazardous Waste Quantity .....	41
8. Hazardous Substance Ecosystem Toxicity, Persistence, Bioaccumulation Potential ..	43
9. Hazardous Waste Quantity .....	44

## FIGURES

Figure 1	Site Location Map .....	12
Figure 2	Jefferson Canal Sample Locations .....	16
Figure 3	Segment 0601 of the Neches River Basin .....	23
Figure 4	Segment 2412 of the Bays .....	24
Figure 5	HRS In-Water Segments .....	26

## HRS Documentation Record - Review Cover Sheet

Name of Site: Star Lake Canal  
a.k.a. Jefferson Canal

### Contact Person:

Documentation Record: Brenda Nixon Cook, USEPA (214) 665-7436  
Region 6 NPL Coordinator

### Pathways, Components or Threats Not Scored:

Ground Water Pathway: The Ground Water Migration Pathway was not scored because an observed release has not been established.

Surface Water Pathway: The Ground Water to Surface Water Migration Component and the Drinking Water Threat were not scored because this site is a contaminated sediment plume and there are no drinking water targets.

Soil Exposure Pathway: The Soil Exposure Pathway was not scored because there is no residential population.

Air Migration Pathway: The Air Migration Pathway was not scored because an observed release has not been established.

## **NOTES TO THE READER**

The following rules were used when citing references in this Documentation Record:

1. If the reference cited had an original page number, that number is cited.
2. If the reference cited had no original page number, then a designated tracking number is cited.
3. If the reference cited is for analytical data found within a table, the sample ID is used to locate that reference.
4. The State predecessor agencies: Texas Water Quality Board (TWQB), Texas Department of Water Resources (TDWR), Texas Water Commission (TWC), and Texas Air Control Board (TACB), referred to throughout this report are now known as the Texas Natural Resource Conservation Commission (TNRCC). The new agency, TNRCC, became effective September 1, 1993, as mandated under State Senate Bill 2 of the 73<sup>rd</sup> Regular Legislative Session.

## HRS Documentation Record

Name of Site: Star Lake Canal

EPA Region: 6

Date Prepared: 7/99

CERCLIS Site ID Number: TX0001 414 341

Site Specific Identifier: 06GY

Street Address of Site: NONE

County and State: Jefferson County, Texas

General Location: General Location in the State: The Star Lake Canal and Jefferson Canal are located in the City of Port Neches, Jefferson County, Texas (Ref. 3, Figure 1).

The Jefferson Canal confluent with Star Lake Canal in an area between State Highway 366 and Sara Jane Road (a.k.a. East Port Neches Avenue, Port Neches Atlantic Highway, Atlantic Road). Star Lake Canal flows northeasterly for approximately ½ mile at which point the left prong of Molasses Bayou branches off to the southeast; Star Lake Canal continues flow to the northeast. Molasses Bayou confluent with Star Lake Canal at the Neches River (Ref. 3, Figure 1).

Topographic Map: Port Arthur North, Texas Quadrangle, 7.5 Minute Series. 1993. (Ref. 3)

Jefferson Canal confluent with Star Lake Canal at approximately:

Latitude: 29° 58' 30" N

Longitude: 93° 55' 1.2" W

## HRS Documentation Record

### Scores

Air Pathway:	Not Scored
Ground Water Pathway:	Not Scored
Soil Exposure Pathway:	Not Scored
Surface Water Pathway:	100

**HRS Site Score:**            **50**

## WORKSHEET FOR COMPUTING HRS SITE SCORE

	<u>S</u>	<u>S<sup>2</sup></u>
1. Ground Water Migration Pathway Score ( $S_{gw}$ ) (from Table 3-1, line 13)	<u>NS</u>	<u>NS</u>
2a. Surface Water Overland/Flood Migration Component (from Table 4-1, line 30)	<u>100</u>	<u>10,000</u>
2b. Ground Water to Surface Water Migration Component (from Table 4-25, line 28)	<u>NS</u>	<u>NS</u>
2c. Surface Water Migration Pathway Score ( $S_{sw}$ ) Enter the larger of lines 2a and 2b as the pathway score.	<u>100</u>	<u>10,000</u>
3. Soil Exposure Pathway Score ( $S_s$ ) (from Table 5-1, line 22)	<u>NS</u>	<u>NS</u>
4. Air Migration Pathway Score ( $S_a$ ) (from Table 6-1, line 12)	<u>NS</u>	<u>NS</u>
5. Total of $S_{gw}^2 + S_{sw}^2 + S_s^2 + S_a^2$	<u>10,000</u>	
6. <b>HRS Site Score</b> Divide the value on line 5 by 4 and take the square root.	<b><u>50</u></b>	

**SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET**

Factor categories and factors	Maximum Value	Value Assigned
<b>Drinking Water Threat</b>		
<b>Likelihood of Release:</b>		
1. Observed Release	550	550
2. Potential to Release by Overland Flow:		
2a. Containment	10	NS
2b. Runoff	10	NS
2c. Distance to Surface Water	5	NS
2d. Potential to Release by Overland Flow [lines 2a(2b + 2c)]	35	NS
3. Potential to Release by Flood:	550	NS
3a. Containment (Flood)	10	NS
3b. Flood Frequency	50	NS
3c. Potential to Release by Flood (lines 3a x 3b)	500	NS
4. Potential to Release (lines 2d + 3c, subject to a maximum of 500)	500	NS
5. Likelihood of Release (higher of lines 1 and 4)	550	550
<b>Waste Characteristics:</b>		
6. Toxicity/Persistence	(a)	NS
7. Hazardous Waste Quantity	(a)	NS
8. Waste Characteristics	100	NS
<b>Targets:</b>		
9. Nearest Intake	50	NS
10. Population:		
10a. Level I Concentrations	(b)	NS
10b. Level II Concentrations	(b)	NS
10c. Potential Contamination	(b)	NS
10d. Population (lines 10a + 10b + 10c)	(b)	NS
11. Resources	5	NS
12. Targets (lines 9 + 10d + 11)	(b)	NS
<b>Drinking Water Threat Score:</b>		
13. Drinking Water Threat Score [(lines 5x8x12)/82,500, subject to max 100]	100	NS
<b>Human Food Chain Threat</b>		
<b>Likelihood of Release:</b>		
14. Likelihood of Release (same value as line 5)	550	550
<b>Waste Characteristics:</b>		
15. Toxicity/Persistence/Bioaccumulation	(a)	5 x 10 <sup>8</sup>
16. Hazardous Waste Quantity	(a)	100
17. Waste Characteristics	1000	320
<b>Targets:</b>		
18. Food Chain Individual	50	20
19. Population		
19a. Level I Concentration	(b)	NS
19b. Level II Concentration	(b)	NS

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET		
Factor categories and factors	Maximum Value	Value Assigned
19c. Potential Human Food Chain Contamination	(b)	NS
19d. Population (lines 19a + 19b + 19c)	(b)	NS
20. Targets (lines 18 + 19d)	(b)	20
<b>Human Food Chain Threat Score:</b>		
21. Human Food Chain Threat Score [(lines 14x17x20)/82,500, subject to max 100]	100	42.67
<b>Environmental Threat</b>		
<b>Likelihood of Release:</b>		
22. Likelihood of Release (same value as line 5)	550	550
<b>Waste Characteristics:</b>		
23. Ecosystem Toxicity/Persistence/Bioaccumulation	(a)	5 x 10 <sup>8</sup>
24. Hazardous Waste Quantity	(a)	100
25. Waste Characteristics	1000	320
<b>Targets:</b>		
26. Sensitive Environments		
26a. Level I Concentrations	(b)	NS
26b. Level II Concentrations	(b)	150
26c. Potential Contamination	(b)	NS
26d. Sensitive Environments (lines 26a + 26b + 26c)	(b)	150
27. Targets (value from line 26d)	(b)	150
<b>Environmental Threat Score:</b>		
28. Environmental Threat Score [(lines 22x25x27)/82,500 subject to a max of 60]	60	60
<b>Surface Water Overland/Flood Migration Component Score for a Watershed</b>		
29. Watershed Score <sup>c</sup> (lines 13+21+28, subject to a max of 100)	100	100
<b>Surface Water Overland/Flood Migration Component Score</b>		
30. Component Score (S <sub>sw</sub> ) <sup>c</sup> (highest score from line 29 for all watersheds evaluated)	100	100

<sup>a</sup> Maximum value applies to waste characteristics category

<sup>b</sup> Maximum value not applicable

<sup>c</sup> Do not round to nearest integer

## REFERENCE LISTING

- | <u>Reference<br/>Number</u> | <u>Description of the Reference</u>   |
|-----------------------------|---|
| 1.                          | U.S. Environmental Protection Agency, 40 CFR Part 300, Hazard Ranking System, Appendix A, 55 FR 51583 December 14, 1990.  |
| 2.                          | U.S. Environmental Protection Agency, Superfund Chemical Data Matrix (SCDM). June 1996.   |
| 3.                          | U.S. Geological Survey, Port Arthur North, Texas Quadrangle, 7.5 Minute Series. <u>Topographic Map</u> . 1993.  |
| 4.                          | Texas Natural Resource Conservation Commission. <u>Screening Site Inspection Report for Star Lake Canal, a.k.a. Jefferson Canal, TX0001414341, Port Neches, Jefferson County, Texas</u> . September 1997. 46 pages.   |
| 5.                          | Texas Natural Resource Conservation Commission. <u>Expanded Site Inspection Report for Star Lake Canal, a.k.a. Jefferson Canal, TX0001414341, Port Neches, Jefferson County, Texas</u> . January 1999. 140 pages.   |
| 6.                          | Texas Natural Resource Conservation Commission. Field Notes for Expanded Site Inspection for Star Lake Canal, a.k.a. Jefferson Canal, TX0001414341, Port Neches, Jefferson County, Texas. March 1998. 83 pages.   |
| 7.                          | Texas Natural Resource Conservation Commission. Field Notes for Screening Site Inspection for Star Lake Canal, a.k.a. Jefferson Canal, YX0001414341, Port Neches, Jefferson County, Texas. October 1996. 52 pages.  |
| 8.                          | Texas Natural Resource Conservation Commission. <u>The State of Texas Water Quality Inventory</u> , Volume 2. December, 1996. Excerpt pages: 13.  |
| 9.                          | Texas Natural Resource Conservation Commission. <u>The State of Texas Water Quality Inventory</u> , Volume 4. December, 1996. Excerpt pages: 13.  |
| 10.                         | U.S. Environmental Protection Agency, Region 6, Houston Branch. Case Number 26055, Sample Delivery Group MFGQ15, CLP Data Review and Analysis Data Package. From: Marvelyn Humphrey, Alternate ESAT RPO, 6MD-HC, To: Bill Kirchner, 6SF-RA. 1998. 39 pages. |

11. U.S. Environmental Protection Agency, Region 6, Houston Branch. Case Number 26055, Sample Delivery Group FEY11, CLP Data Review and Analysis Data Package. From: Marvelyn Humphrey, Alternate ESAT RPO, 6MD-HC, To: Bill Kirchner, 6SF-RA. 1998. 163 pages.
12. U.S. Environmental Protection Agency, Region 6, Houston Branch. Case Number 26055, Sample Delivery Group MFGQ21, CLP Data Review and Analysis Data Package. From: Marvelyn Humphrey, Alternate ESAT RPO, 6MD-HC, To: B. Kirchner, 6SF-RA. 1998. 38 pages.
13. U.S. Environmental Protection Agency, Region 6, Houston Branch. Case Number 26055, Sample Delivery Group FEY08, CLP Data Review and Analysis Data Package. From: Marvelyn Humphrey, Alternate ESAT RPO, 6MD-HC, To: B. Kirchner, 6SF-RA. 1998. 168 pages.
14. U.S. Geological Survey, West of Green's Bayou, Texas Quadrangle, 7.5 Minute Series. Topographic Map. 1993.
15. U.S. Geological Survey, Port Arthur South, Texas Quadrangle, 7.5 Minute Series. Topographic Map. 1993.
16. U.S. Geological Survey, West of Johnson's Bayou, Texas Quadrangle, 7.5 Minute Series. Topographic Map. 1993.
17. U.S. Environmental Protection Agency, Region 6, Houston Branch. Case Number 25093, Sample Delivery Group MFGP43, CLP Data Review and Analysis Data Package. From: Melvin L. Ritter, ESAT RPO, 6MD-HC, To: B. Canellas, 6SF-RA. 1996. 37 pages.
18. U.S. Environmental Protection Agency, Region 6, Houston Branch. Case Number 25093, Sample Delivery Group MFGP63, CLP Data Review and Analysis Package. From: Melvin L. Ritter, ESAT RPO, 6MD-HC, To: B. Canellas, 6SF-RA. 1996. 14 pages.
19. U.S. Environmental Protection Agency, Region 6, Houston Branch. Case Number 25093, Sample Delivery Group FEY80, CLP Data Review and Analysis Data Package. From: Melvin L. Ritter, ESAT RPO, 6MD-HC, To: B. Canellas, 6SF-RA. 1996. 152 pages.

20. U.S. Environmental Protection Agency, Region 6, Houston Branch. Case Number 26055, Sample Delivery Group MFGQ20, CLP Data Review and Analysis Data Package. From: Marvelyn Humphrey, Alternate ESAT RPO, 6MD-HC, To: B. Kirchner, 6SF-RA. 1998. 14 pages.
21. Moritz, Clarence W., District 6 Supervisor, Texas Department of Water Resources, to Steve Cook, Investigation Unit, Enforcement Support Section, Interoffice Memorandum. August 13, 1979. 32 pages.
22. District Court of Jefferson County, Texas, 136<sup>th</sup> Judicial District, State of Texas, Plaintiff vs. Chemall, Inc. Defendant. Agreed final judgement. December 13, 1982. 3 pages.
23. Knudson, Myron, P.E., Director, Water Management Division, U.S. Environmental Protection Agency, Region 6, to Michael J. Kern, Senior Vice President, Huntsman Corporation. Final NPDES permit decision. April 1995. 37 pages.
24. Texas Natural Resource Conservation Commission to Huntsman Corporation, Texaco Chemical Inc., and Ameripol Synpol Corporation. Permit to dispose of wastes. December 16, 1994. 36 pages.
25. Texas Water Commission to Ameripol Synpol Company, A Division of Uniroyal Goodrich Tire Company. Permit to dispose of wastes. July 30, 1991. 8 pages.
26. Texas Water Commission to Jefferson Chemical Company, Inc. Permit to dispose of wastes. March 3, 1980. 13 pages.
27. Texas Department of Water Resources. Endorsement to Texas Water Commission Permit No. 00585 for Jefferson Chemical Company, Inc. (changing name to Texaco, Inc.) June 11, 1980. 1 page.
28. Texas Natural Resource Conservation Commission to Calabrian Chemicals Corporation. Permit to dispose of wastes. May 30, 1995. 19 pages.
29. Texas Water Commission to Chemall, Inc. Permit to dispose of wastes. February 27, 1989. 10 pages.
30. Texas Natural Resource Conservation Commission to Charlie Cogliandro, Calabrian Chemical Corp. Agreed order assessing administrative penalties and requiring certain actions. August 26, 1996. 28 pages.

31. Jefferson County Deed Record. Easement granted by Texaco, Inc. to Jefferson County Drainage District No. 7. July 22, 1982. 7 pages.
32. Moore, M., District 6 to Texas Department of Water Resources files. Telephone memorandum to the file - Contaminated soil dredged from the drainage ditch below FM road 366 in Port Neches, Jefferson County. March 22, 1983. 2 pages.
33. Moore, Michael A., Engineering Technician, District 6, Texas Department of Water Resources, to Gary Schroeder, Chief, Solid Waste and Spill Response, Enforcement and Field Operations, Texas Department of Water Resources. Interoffice memorandum. August 25, 1983. 3 pages.
34. Boudreaux, Harry R., District 6 Supervisor, Texas Department of Water Resources, to Gary Schroeder, Chief, Solid Waste and Spill Response, Enforcement and Field Operations, Texas Department of Water Resources. Interoffice memorandum. April 5, 1983. 5 pages.
35. Texas Parks and Wildlife Department, Coastal Fisheries Division. Trends in Texas Commercial Fishery Landings, 1972-1996. Management Data Series, No, 141, 1997. Excerpt pages: 14.
36. Letter to Wesley G. Newberry, TNRCC from Dorinda Scott, Texas Parks and Wildlife Department. October 10, 1996. 14 pages.
37. U.S. Department of the Interior, Port Arthur North, Texas Quadrangle, 7.5 Minute Series. National Wetlands Inventory Map. 1998.
38. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response. Hazard Ranking System Guidance Manual. Publication 9345.1-07, PB92-963377, EPA 540-R-92-026, Interim Final. November 1992. Excerpt pages: 1.
39. Marshall A. Cedilote, Project Manager, Superfund Site Discovery & Assessment Program, TNRCC, to File. Interoffice memorandum. June 15, 1999. 3 pages.
40. CompuChem Environmental Corporation. Revisions and Quantitation and Ratio Report, Client Sample ID: FEZ01. November 4, 1996. 63 pages.

41. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response. Using Qualified Data to Document an Observed Release and Observed Contamination. Publication 9285.7-14FS, PB95-963320, EPA 540-F-95-033, Quick Reference Fact Sheet. November 1996. Excerpt pages: 1.

## 2.2 SOURCE CHARACTERIZATION

### 2.2.1 SOURCE IDENTIFICATION

- Number of the source: 1
- Name and description of the source: Other (Contaminated Sediments)

Elevated concentrations of hazardous substances have been documented in sediments of the Jefferson Canal, Star Lake Canal and Molasses Bayou. Specific sources of this contamination were not identified during investigations conducted by the Texas Natural Resource Conservation Commission in 1996 and 1998 (Ref. 4, Ref. 5). Therefore, the contaminated sediments will be evaluated as the source for HRS scoring purposes (Ref. 38, p. 46)

- Location of the source, with reference to a map of the site:

Star lake Canal, Jefferson Canal and Molasses Bayou lie within the City of Port Neches, between Texas State Highway 366 and the Neches River (Ref. 3). See Figure 1.

- Containment

**Gas release to air:** The air migration pathway was not scored; therefore, gas containment was not evaluated.

**Particulate release to air:** The air migration pathway was not scored; therefore, particulate containment was not evaluated.

**Release to ground water:** The ground water pathway was not scored; therefore, ground water containment was not evaluated.

**Release via overland migration and/or flood:** Source consists of contaminated sediments. There is no containment and no liner present to prevent the migration of hazardous substances from the contaminated sediments. Therefore, a containment factor value of 10 is assigned (Ref. 1, Table 4-2, Section 4.1.2.1.2.1.1, p. 51609).

## 2.2.2 HAZARDOUS SUBSTANCES ASSOCIATED WITH A SOURCE

The source area is defined as the contaminated sediments of the Jefferson Canal, Star Lake Canal and the left prong of Molasses Bayou. A total of twenty five (25) sediment samples have been collected within the Jefferson Canal, Star Lake Canal and Molasses Bayou during the Screening Site Inspection (SSI) and the Expanded Site Inspection (ESI) conducted by the TNRCC in October 1996 and March 1998, respectively (Ref. 4, Ref. 5).

Sediment sample locations are shown in Figure 2 (Ref. 3, Ref. 4, pp. 042-043; Ref. 5, pp. 127, 129-132, 136-139; Ref. 6, pp. 078-079, pp. 081-082; Ref. 7, p. 010; Ref. 39, pp. 001-003).

Table 1 represents the thirteen (13) individual samples that define the source area. For a list of hazardous substances that meet observed release criteria and their concentrations at each sample location, see Table 4.

<b>Table 1</b> <b>Source Description</b> <b>Contaminated Sediment Samples Collected from Jefferson Canal,</b> <b>Star Lake Canal and Molasses Bayou</b>				
CLP Sample ID	Sample Location/Event	Sample Depth	Date Collected	Location Reference
FEY40 MFGQ15	SE-31/ESI Uppermost reach of Jefferson Canal	Composite sample (2) 0"-12"	3/10/98	Figure 2; Ref. 5, p. 019; Ref. 6, p. 078; Ref. 39, p. 002
FEY14 MFGQ20	SE-32/ESI Jefferson Canal upstream of hurricane protection levee	Composite sample (3) 0"-8"	3/10/98	Figure 2; Ref. 5, p. 019; Ref. 6, p. 078; Ref. 39, p. 002
FEY12 MFGQ22	SE-36/ESI Jefferson Canal upstream of hurricane protection levee	Grab sample 0"-30"	3/10/98	Figure 2; Ref. 5, p. 019, p. 136; Ref. 6, p. 079; Ref. 39, p. 002
FEY13 MFGQ21	SE-37/ESI Jefferson Canal downstream of hurricane protection levee	Composite sample (2) 0"-12"	3/11/98	Figure 2; Ref. 5, p. 019, p. 139; Ref. 6, p. 082; Ref. 39, p. 003
Table 1 continued ...				

SD-Hazardous Substances  
Source No. 1, Other (Contaminated Sediments)

<b>Table 1</b> <b>Source Description</b> <b>Contaminated Sediment Samples Collected from Jefferson Canal,</b> <b>Star Lake Canal and Molasses Bayou</b>				
CLP Sample ID	Sample Location/Event	Sample Depth	Date Collected	Location Reference
FEY08 MFGQ26	SE-38/ESI Jefferson Canal downstream of hurricane protection levee	Composite sample 0"-30"	3/11/98	Figure 2; Ref. 5, p. 019, p. 138; Ref. 6, p. 082; Ref. 39, p. 003
FEY09 MFGQ25	SE-39/ESI Jefferson Canal downstream of hurricane protection levee	Composite sample (2) 0"-12"	3/11/98	Figure 2; Ref. 5, p. 019, p. 137; Ref. 6, p. 081; Ref. 39, p. 003
FEY77 MFGP40	SE-16/SSI Jefferson Canal upstream of SE-19	Grab sample 0"-30"	10/23/96	Figure 2; Ref. 4, p. 013, p. 042; Ref. 7, p. 010, p. 042; Ref. 39, p. 001
FEZ01 MFGP61	SE-19/SSI Confluence of Jefferson Canal with Star Lake Canal	Grab sample 0"-30"	10/23/96	Figure 2; Ref. 4, p. 013; Ref. 7, p. 010, p. 045; Ref. 39, p. 002
FFS44 MFHM62	SE-26/ESI Molasses Bayou	Grab sample 0"-30"	3/11/98	Figure 2; Ref. 5, p. 020, p. 131; Ref. 6, p. 015; Ref. 39, p. 002
FEY84 MFGP47	SE-11/SSI Molasses Bayou	Grab sample 0"-30"	10/23/96	Figure 2; Ref. 4, p. 013, p. 043; Ref. 7, p. 010, p. 037; Ref. 39, p. 001
Table 1 continued ...				

SD-Hazardous Substances  
Source No. 1, Other (Contaminated Sediments)

<b>Table 1</b> <b>Source Description</b> <b>Contaminated Sediment Samples Collected from Jefferson Canal,</b> <b>Star Lake Canal and Molasses Bayou</b>				
<b>CLP Sample ID</b>	<b>Sample Location/Event</b>	<b>Sample Depth</b>	<b>Date Collected</b>	<b>Location Reference</b>
FFS45 MFHM60	SE-27/ESI Molasses Bayou	Composite sample (2) 0"-12"	3/11/98	Figure 2; Ref. 5, p. 020, p. 132; Ref. 6, p. 015; Ref. 39, p. 002
FFR09 MFHL31	SE-23/ESI Molasses Bayou	Grab sample 0"-30"	3/11/98	Figure 2; Ref. 5, p. 020, p. 129; Ref. 6, p. 014; Ref. 39, p. 002
FFR35 MFHL63	SE-17/ESI Molasses Bayou	Grab sample 0"-30"	3/11/98	Figure 2; Ref. 5, p. 020, p. 127; Ref. 6, p. 014; Ref. 39, p. 002

A complete list of hazardous substances found in the sediment samples can be found in Reference 5, p. 109. The hazardous substances which will be used in scoring this site are:

Chromium  
Copper  
Benzo(a)anthracene  
Benzo(a)pyrene  
Aldrin  
Aroclor-1254

### **2.2.3 HAZARDOUS SUBSTANCES AVAILABLE TO A PATHWAY**

Because containment for this source is greater than 0, the following substances associated with the source can migrate via the surface water migration pathway:

Chromium  
Copper  
Benzo(a)anthracene  
Benzo(a)pyrene  
Aldrin  
Aroclor-1254

### **2.3 LIKELIHOOD OF RELEASE**

Refer to Section 4.1.2.1 of this Documentation Record for specific information related to the sediment samples that meet the criteria for an observed release to the Surface Water Pathway.

### **2.4 WASTE CHARACTERISTICS**

#### **2.4.1 SELECTION OF SUBSTANCE POTENTIALLY POSING GREATEST HAZARD**

Refer to Sections 4.1.3.2.1 and 4.1.4.2.1 for selection of substances potentially posing the greatest hazard.

## **2.4.2. HAZARDOUS WASTE QUANTITY**

### **2.4.2.1.1. HAZARDOUS CONSTITUENT QUANTITY (Tier A)**

The information available is not sufficient to evaluate Tier A; therefore, it is not possible to adequately determine a hazardous constituent quantity for Source 1, the contaminated sediments. As a result, the evaluation of Hazardous Waste Quantity proceeds to the evaluation of Tier B, hazardous waste stream quantity (Ref. 1, Section 2.4.2.1.1, p. 51591).

### **2.4.2.1.2. HAZARDOUS WASTE STREAM QUANTITY (Tier B)**

The information available is not sufficient to evaluate Tier B, therefore, it is not possible to adequately determine a hazardous waste stream quantity for Source 1, the contaminated sediments. As a result, the evaluation of Hazardous Waste Quantity proceeds to the evaluation of Tier C, volume (Ref. 1, Section 2.4.2.1.2, p. 51591).

### **2.4.2.1.3. VOLUME (Tier C)**

The information available is not sufficient to evaluate Tier C, therefore, it is not possible to adequately determine a volume for Source 1, the contaminated sediments. (Ref. 1, Section 2.4.2.1.3, p. 51591). The volume of the contaminated sediments is unknown, but >0.

### **2.4.2.1.4. AREA (Tier D)**

Tier D is not evaluated for source type "Other" (Ref. 1, Table 2-5).

Dimension of source (yd<sup>3</sup> or gallons): Unknown, but >0  
Volume Assigned Value: >0

#### 2.4.2.1.5. SOURCE HAZARDOUS WASTE QUANTITY VALUE

As described in the HRS Final Rule, the highest value assigned to a source from among the four tiers of hazardous constituent quantity (Tier A), hazardous waste stream quantity (Tier B), volume (Tier C) or area (Tier D) shall be selected as the source hazardous waste quantity value. (Ref. 1, Sections 2.4.2.1.1 - 2.4.2.1.5, p. 51591).

Table 2 Hazardous Waste Quantity Value	
Tier Evaluated	Source 1 Values
A	NE
B	NE
C	Unknown, but >0
D	N/A

NE = not evaluated

Hazardous Waste Quantity Value: >0, but unknown

Assigned Hazardous Waste Quantity Factor Value: 100 (Ref. 1, Section 2.4.2.2, p. 51592)

### **3.0 GROUND WATER MIGRATION PATHWAY**

#### **3.1.1 OBSERVED RELEASE**

The Ground Water Migration Pathway was not scored.

#### **4.0 SURFACE WATER MIGRATION PATHWAY**

#### **4.1 OVERLAND FLOOD MIGRATION COMPONENT**

#### **4.1.1.1 DEFINITION OF HAZARDOUS SUBSTANCE MIGRATION PATH FOR OVERLAND/FLOOD COMPONENT**

##### **General Considerations**

The Jefferson Canal is located adjacent to Segment 0601 (Neches River Tidal) of the Neches River Basin (Ref. 8, p. 333). The Jefferson Canal drains to Star Lake Canal, thence to the Neches River, thence to Sabine Lake. Sabine Lake is located within Segment 2412 of the Bays (Ref. 9, p. 361). See Figures 3 and 4 for the location of the Jefferson Canal with respect to Segment 0601 of the Neches River Basin and Segment 2412 of the Bays.

##### **State of Texas Water Quality Segments**

Surface water drainage from the Jefferson Canal, Star Lake Canal and Molasses Bayou will come into contact with two (2) Texas Water Quality Segments (Ref. 8, p. 333; Ref. 9, p. 361). The Texas Surface Water Quality Standards (Title 30, Chapter 307 of the Texas Administrative Code) establish explicit water quality goals throughout the State. Regional hydrologic and geologic diversity is given consideration by dividing major river basins, bays and estuaries into defined segments (referred to as classified and designated segments). Segment-specific standards identify appropriate uses for specific water bodies (aquatic life, contact or noncontact recreation, drinking water, etc.) and list upper and lower limits for common indicators (criteria) of water quality - such as dissolved oxygen, temperature, pH, dissolved minerals, and fecal coliform bacteria. Other standards - such as toxic criteria to protect aquatic life and human health - are applied statewide (Ref. 8, pp. 001-005; Ref. 9, pp. 001-005). The Texas Water Quality Segments in the surface water migration pathway of the Star Lake Canal site are described below.

##### **Neches River Basin, Segment 0601 (Neches River Tidal)**

Segment 0601 of the Neches River Basin extends from the confluence with Sabine Lake to a point 7.0 miles upstream of Interstate Highway 10 in Orange County (27 miles). The tidal portion of the Neches River is highly developed, industrialized and an international port. The segment is classified as Effluent Limited and designated for Contact Recreation and Intermediate Aquatic Life. Along this segment there are 12 domestic outfalls and 36 industrial outfalls (Ref. 8, p. 335, 336). Segment 0601 of the Neches River Basin is shown in Figure 3.

## SWOF-Surface Water Overland Flow/Flood Migration Pathway

### Bays, Segment 2412 (Sabine Lake)

Segment 2412 of the Bays extends from the end of the jetties at the gulf of Mexico to State Highway 82, encompassing 2.1 square miles. This segment is classified as Water Quality Limited due to water quality standard violations. It is designated for Contact Recreation, High Aquatic Life and Oyster Waters. However, due to elevated fecal coliform densities, Sabine Lake is not an oyster water. Arsenic and manganese are also elevated in this area. There are no domestic or industrial discharges to this segment (Ref. 9, p. 368). Segment 2412 of the Bays is shown in Figure 4.

**Definition of Overland Segment and Probable Point of Entry (PPE)**

There is no overland segment or PPE for sites that consist of contaminated sediments with no identified source. The hazardous substance migration path begins in the Jefferson Canal at the farthest upstream sample and continues to the most distant downstream sample meeting observed release criteria in Molasses Bayou.

**Definition of In-Water Segments**

The Target Distance Limit (TDL) for this site is comprised of four (4) Hazard Ranking System (HRS) In-Water Segments, which are included within two (2) State of Texas Water Quality Segments. The components of these HRS In-Water segments are discussed below.

**HRS In-Water Segment 1 (Jefferson Canal, Star Lake Canal and Molasses Bayou - Level II):** (approximately 2.15 miles) is defined as the in-water distance from the farthest upstream sample meeting observed release criteria to the most distant downstream sample meeting observed release criteria. Sediment samples SE-31 and SE-17 represent these points (see Figure 2, Table 4). This In-Water Segment is shown in Figure 5 (Ref. 3, Ref. 14, Ref. 15, Ref. 16).

**HRS In-Water Segment 2 (Remainder of Molasses Bayou):** (approximately 0.25 miles) is defined as the in-water distance from the farthest downstream sediment sample meeting observed release criteria in Molasses Bayou to the confluence of Star Lake Canal with the Neches River (see Figure 2). This In-Water Segment is shown in Figure 5 (Ref. 3, Ref. 14, Ref. 15, Ref. 16).

**HRS In-Water Segment 3 (Neches River):** (approximately 3.6 miles) is defined as the in-water distance of the Neches River from its confluence with Star Lake Canal to Sabine Lake. This In-Water Segment is shown in Figure 5 (Ref. 3, Ref. 14, Ref. 15, Ref. 16).

**HRS In-Water Segment 4 (Sabine Lake):** (approximately 9 miles) is defined as the in-water distance from the mouth of the Neches River and extending in an arc to the 15 mile TDL in Sabine Lake. This In-Water Segment is shown in Figure 5 (Ref. 3, Ref. 14, Ref. 15, Ref. 16).

## **4.1.2 DRINKING WATER THREAT**

The drinking water threat was not scored. The documentation for an observed release to surface water follows, then scoring will proceed to the human food chain and environmental threats.

### **4.1.2.1 LIKELIHOOD OF RELEASE**

#### **4.1.2.1.1 OBSERVED RELEASE**

An observed release to a qualifying surface water body can be documented in the HRS system by two methods: a) direct observation and b) chemical analysis. We will document the observed release by chemical analysis in this Documentation Report.

#### Chemical Analysis

An observed release has been documented to the surface water pathway for the Star Lake Canal site by chemical analysis. For sites that consist of contaminated sediments with no identified source, establishing an observed release by chemical analysis requires demonstrating that the concentration of the hazardous substance(s) in a release sample is significantly increased above background; no separate attribution is required (Ref. 1, Section 4.1.2.1.1). In order to document a significant increase above background, it is necessary to establish the presence of hazardous substance(s) at concentrations three times above a designated background level when the hazardous substance(s) have been detected in the background sample or at concentrations above the release samples' and the background samples' Sample Quantitation Limits (SQL) when a hazardous substance(s) has been reported as not detected in background samples (Ref. 1, Table 2-3, p. 51589).

#### **Background Concentration**

The following table provides a summary of the designated background levels for the organic and inorganic hazardous substances of concern for this site.

Two (2) background sediment samples, SE-20(FEZ02/MFGP62) and SE-21 (FEZ03/MFGP63) were collected in Star Lake Canal during the SSI. See Figure 2 for the locations of the background sediment samples. A summary of the highest constituent concentrations detected in the background sediment samples is presented in Table 3.

SWOF-Surface Water Overland Flow/Flood Migration Pathway  
SWOF - Observed Release

<p style="text-align: center;"><b>Table 3</b> <b>Surface Water Pathway</b> <b>Summary of Highest Organic and Inorganic Constituents Detected in Background Sediment Samples</b></p>						
Hazardous Substance	Station/CLP No.	Date Collected	Sample Depth	Highest Concentration [SQL] mg/Kg	3 x Highest Background Concentration mg/Kg	Reference
Chromium	SE-21/MFGP63	10/23/96	Composite sample 0" - 4"	32.5 [1.6]	97.5 [1.6]	Figure 2, Ref. 4, p. 041; Ref. 7, pp. 009-010; Ref. 39, p. 002; Ref. 18, pp. 8, 13, 14
Copper	SE-21/MFGP63	10/23/96	Composite sample 0" - 4"	20.2 [0.67]	60.6 [0.67]	Figure 2, Ref. 4, p. 041; Ref. 7, pp. 009-010; Ref. 39, p. 002; Ref. 18, pp. 8, 13, 14
Benzo(a)anthracene	SE-20/FEZ02	10/23/96	Composite sample 0" - 4"	ND [550]	N/A [550]	Figure 2, Ref. 4, p. 041; Ref. 7, pp. 009-010; Ref. 39, p. 002; Ref. 19, pp. 19, 23, 125, 146, 148
Benzo(a)pyrene	SE-20/FEZ02	10/23/96	Composite sample 0" - 4"	ND [550]	N/A [550]	Figure 2, Ref. 4, p. 041; Ref. 7, pp. 009-010; Ref. 39, p. 002; Ref. 19, pp. 19, 23, 125, 146, 148
Aldrin	SE-20/FEZ02	10/23/96	Composite sample 0" - 4"	ND [2.8]	N/A [2.8]	Figure 2, Ref. 4, p. 041; Ref. 7, pp. 009-010; Ref. 39, p. 002; Ref. 19, pp. 19, 23, 125, 146, 148
Aroclor-1254	SE-20/FEZ02	10/23/96	Composite sample 0" - 4"	ND [55]	N/A [55]	Figure 2, Ref. 4, p. 041; Ref. 7, pp. 009-010; Ref. 39, p. 002; Ref. 19, pp. 19, 23, 125, 146, 148

ND = Not detected. Concentrations for these constituents were not detected at the reported quantitation limit in sediment samples considered for the development of sediment background levels.

[SQL] = (CRQL) x (df) / % solids, where % solids = [100 - % moisture] / 100. For inorganic constituents, IDL replaces CRQL.

N/A = Not Applicable

SWOF-Surface Water Overland Flow/Flood Migration Pathway  
SWOF - Observed Release

### Contaminated Samples

The following samples were qualified as "releases" based on the criteria in HRS Table 2-3 (Ref. 1, p. 51589). These samples meet the observed release criteria and are presented below indicating organic and inorganic hazardous substances with their concentrations and SQLs.

To further substantiate and delineate the area of contamination, an ESI was conducted in March, 1998. Sediment samples were collected upstream in the Jefferson Canal and downstream within Molasses Bayou. Analytical results presented below show releases of the same hazardous substances in sediment samples collected during the SSI and ESI.

<b>Table 4</b> <b>Surface Water Pathway</b> <b>Contaminated Sediment Samples Collected from Jefferson Canal,</b> <b>Star Lake Canal and Molasses Bayou</b>				
CLP Sample ID	Sample Location/Event	Sample Depth	Date Collected	Location Reference
FEY40 MFGQ15	SE-31/ESI Uppermost reach of Jefferson Canal	Composite sample (2) 0"-12"	3/10/98	Figure 2; Ref. 5, p. 019; Ref. 6, p. 078; Ref. 39, p. 002
FEY14 MFGQ20	SE-32/ESI Jefferson Canal upstream of hurricane protection levee	Composite sample (3) 0"-8"	3/10/98	Figure 2; Ref. 5, p. 019; Ref. 6, p. 078; Ref. 39, p. 002
FEY12 MFGQ22	SE-36/ESI Jefferson Canal upstream of hurricane protection levee	Grab sample 0"-30"	3/10/98	Figure 2; Ref. 5, p. 019, p. 136; Ref. 6, p. 079; Ref. 39, p. 002
FEY13 MFGQ21	SE-37/ESI Jefferson Canal downstream of hurricane protection levee	Composite sample (2) 0"-12"	3/11/98	Figure 2; Ref. 5, p. 019, p. 139; Ref. 6, p. 082; Ref. 39, p. 003
FEY08 MFGQ26	SE-38/ESI Jefferson Canal downstream of hurricane protection levee	Composite sample 0"-30"	3/11/98	Figure 2; Ref. 5, p. 019, p. 138; Ref. 6, p. 082; Ref. 39, p. 003
FEY09 MFGQ25	SE-39/ESI Jefferson Canal downstream of hurricane protection levee	Composite sample (2) 0"-12"	3/11/98	Figure 2; Ref. 5, p. 019, p. 137; Ref. 6, p. 081; Ref. 39, p. 003
Table 4 continued ...				

SWOF-Surface Water Overland Flow/Flood Migration Pathway  
SWOF - Observed Release

<b>Table 4</b> <b>Surface Water Pathway</b> <b>Contaminated Sediment Samples Collected from Jefferson Canal,</b> <b>Star Lake Canal and Molasses Bayou</b>				
CLP Sample ID	Sample Location/Event	Sample Depth	Date Collected	Location Reference
FEY77 MFGP40	SE-16/SSI Jefferson Canal upstream of SE-19	Grab sample 0"-30"	10/23/96	Figure 2; Ref. 4, p. 013, p. 042; Ref. 7, p. 010, p. 042; Ref. 39, p. 001
FEZ01 MFGP61	SE-19/SSI Confluence of Jefferson Canal with Star Lake Canal	Grab sample 0"-30"	10/23/96	Figure 2; Ref. 4, p. 013; Ref. 7, p. 010, p. 045; Ref. 39, p. 002
FFS44 MFHM62	SE-26/ESI Molasses Bayou	Grab sample 0"-30"	3/11/98	Figure 2; Ref. 5, p. 020, p. 131; Ref. 6, p. 015; Ref. 39, p. 002
FEY84 MFGP47	SE-11/SSI Molasses Bayou, downstream of SE-10 location	Grab sample 0"-30"	10/23/96	Figure 2; Ref. 4, p. 013, p. 043; Ref. 7, p. 010, p. 037; Ref. 39, p. 001
FFS45 MFHM60	SE-27/ESI Molasses Bayou	Composite sample (2) 0"-12"	3/11/98	Figure 2; Ref. 5, p. 020, p. 132; Ref. 6, p. 015; Ref. 39, p. 002
FFR09 MFHL31	SE-23/ESI Molasses Bayou	Grab sample 0"-30"	3/11/98	Figure 2; Ref. 5, p. 020, p. 129; Ref. 6, p. 014; Ref. 39, p. 002
FFR35 MFHL63	SE-17/ESI Molasses Bayou	Grab sample 0"-30"	3/11/98	Figure 2; Ref. 5, p. 020, p. 127; Ref. 6, p. 014; Ref. 39, p. 002
Table 4 continued ...				

SWOF-Surface Water Overland Flow/Flood Migration Pathway  
SWOF - Observed Release

<b>Table 4</b> <b>Surface Water Pathway</b> <b>Contaminated Sediment Samples Collected from Jefferson Canal,</b> <b>Star Lake Canal and Molasses Bayou</b>				
<b>Sample Location/ CLP ID</b>	<b>Hazardous Substance</b>	<b>Concentration</b>	<b>[SQL]</b>	<b>Reference</b>
SE-31/ MFGQ15 FEY40 FEY40DL	Chromium	35mg/Kg	[0.5]	Ref. 10, pp. 001-007, p. 009, p. 016, p. 020
	Copper	184 mg/Kg	[1]	Ref. 10, pp. 001-007, p. 009, p. 016, p. 020
	Benzo(a)anthracene	2400 µg/Kg	[670]	Ref. 11, pp. 001-010, p. 018, p. 037, p. 100
	Benzo(a)pyrene	1500 µg/Kg	[670]	Ref. 11, pp. 001-010, p. 018, p. 037, p. 100
	Aldrin	ND	[3.3]	Ref. 11, pp. 001-010, p. 023, p. 037, p. 146
	Aroclor-1254	1500 µg/Kg	[650]	Ref. 11, pp. 001-010, p. 023, p. 024, p. 037, p. 163
SE-32/ MFGQ20 FEY14	Chromium	134 J mg/Kg	[0.47]	Ref. 20, pp. 001-007, p. 009, p. 013, p. 014
	Copper	33.2 J mg/Kg	[0.95]	Ref. 20, pp. 001-007, p. 009, p. 013, p. 014
	Benzo(a)anthracene	73000 µg/Kg	[22000 ]	Ref. 11, pp. 001-010, p. 016, p. 037, p. 088
	Benzo(a)pyrene	46000 µg/Kg	[22000 ]	Ref. 11, pp. 001-010, p. 016, p. 037, p. 088
	Aldrin	ND	[19]	Ref. 11, pp. 001-010, p. 023, p. 037, p. 143
	Aroclor-1254	ND	[370]	Ref. 11, pp. 001-010, p. 023, p. 037, p. 143
Table 4 continued ...				

ND = Not detected. Concentrations for these constituents were not detected at the reported quantitation limit in sediment samples.

[SQL] = The sample quantitation limit. SQL for metals is mg/Kg, SQL for organics is µg/Kg. SQL = (CRQL) x (df) / % solids, where % solids = [100 - % moisture] / 100. For inorganic constituents, IDL replaces CRQL.

J = The value is an estimated concentration because one or more of the quality control criteria have not been met. It is included to show that the substance has been qualitatively identified as present in this source.

Shaded samples = The sample met observed release criteria for that hazardous substance.

SWOF-Surface Water Overland Flow/Flood Migration Pathway  
SWOF - Observed Release

<b>Table 4</b> <b>Surface Water Pathway</b> <b>Contaminated Sediment Samples Collected from Jefferson Canal,</b> <b>Star Lake Canal and Molasses Bayou</b>				
<b>Sample Location/ CLP ID</b>	<b>Hazardous Substance</b>	<b>Concentration</b>	<b>[SQL]</b>	<b>Reference</b>
SE-36/ MFGQ22 FEY12	Chromium	24.2 mg/Kg	[0.3]	Ref. 10, pp. 001-007, p. 009, p. 019, p. 023
	Copper	25.2 mg/Kg	[0.6]	Ref. 10, pp. 001-007, p. 009, p. 019, p. 023
	Benzo(a)anthracene	510 µg/Kg	[510]	Ref. 11, pp. 001-010, p. 016, p. 035, p. 082
	Benzo(a)pyrene	300 J µg/Kg	[510]	Ref. 11, pp. 001-010, p. 016, p. 035, p. 082
	Aldrin	ND	[13]	Ref. 11, pp. 001-010, p. 023, p. 035, p. 142
	Aroclor-1254	ND	[250]	Ref. 11, pp. 001-010, p. 023, p. 035, p. 142
SE-37/ MFGQ23 FEY13	Chromium	30.7 mg/Kg	[0.3]	Ref. 12, pp. 001-006, p. 008, p. 016, p. 019
	Copper	93.7 mg/Kg	[0.3]	Ref. 12, pp. 001-006, p. 008, p. 016, p. 019
	Benzo(a)anthracene	1600 µg/Kg	[1400]	Ref. 13, pp. 001-009, p. 015, p. 028, p. 087
	Benzo(a)pyrene	1200 J µg/Kg	[1400]	Ref. 13, pp. 001-009, p. 015, p. 028, p. 087
	Aldrin	35 J µg/Kg	[3.5]	Ref. 13, pp. 001-009, p. 022, p. 028, p. 152
	Aroclor-1254	510 µg/Kg	[69]	Ref. 13, pp. 001-009, p. 022, p. 028, p. 152
Table 4 continued ...				

ND = Not detected. Concentrations for these constituents were not detected at the reported quantitation limit in sediment samples.

[SQL] = The sample quantitation limit. SQL for metals is mg/Kg, SQL for organics is µg/Kg. SQL = (CRQL) x (df) / % solids, where % solids = [100 - % moisture] / 100. For inorganic constituents, IDL replaces CRQL.

J = The value is an estimated concentration because one or more of the quality control criteria have not been met. It is included to show that the substance has been qualitatively identified as present in this source.

Shaded samples = The sample met observed release criteria for that hazardous substance.

SWOF-Surface Water Overland Flow/Flood Migration Pathway  
SWOF - Observed Release

<p style="text-align: center;"><b>Table 4</b> <b>Surface Water Pathway</b> <b>Contaminated Sediment Samples Collected from Jefferson Canal,</b> <b>Star Lake Canal and Molasses Bayou</b></p>				
<b>Sample Location/ CLP ID</b>	<b>Hazardous Substance</b>	<b>Concentration</b>	<b>[SQL]</b>	<b>Reference</b>
SE-38/ MFGQ26 FEY08	Chromium	37.5 mg/Kg	[0.45]	Ref. 12, pp. 001-006, p. 008, p. 017, p. 022
	Copper	386 mg/Kg	[0.45]	Ref. 12, pp. 001-006, p. 008, p. 017, p. 022
	Benzo(a)anthracene	770 µg/Kg	[540]	Ref. 13, pp. 001-009, p. 015, p. 028, p. 075
	Benzo(a)pyrene	590 µg/Kg	[540]	Ref. 13, pp. 001-009, p. 015, p. 028, p. 075
	Aldrin	3.7 J µg/Kg	[2.8]	Ref. 13, pp. 001-009, p. 022, p. 028, p. 149
	Aroclor-1254	380 µg/Kg	[54]	Ref. 13, pp. 001-009, p. 022, p. 028, p. 149
SE-39/ MFGQ25 FEY09	Chromium	62.2 mg/Kg	[0.7]	Ref. 12, pp. 001-006, p. 009, p. 017, p. 021
	Copper	350 mg/Kg	[0.7]	Ref. 12, pp. 001-006, p. 009, p. 017, p. 021
	Benzo(a)anthracene	2500 µg/Kg	[1300]	Ref. 13, pp. 001-009, p. 015, p. 030, p. 078
	Benzo(a)pyrene	1400 µg/Kg	[1300]	Ref. 13, pp. 001-009, p. 015, p. 030, p. 078
	Aldrin	12 J µg/Kg	[6.8]	Ref. 13, pp. 001-009, p. 022, p. 030, p. 150
	Aroclor-1254	430 J µg/Kg	[130]	Ref. 13, pp. 001-009, p. 022, p. 030, p. 150
Table 4 continued ...				

ND = Not detected. Concentrations for these constituents were not detected at the reported quantitation limit in sediment samples.

[SQL] = The sample quantitation limit. SQL for metals is mg/Kg, SQL for organics is µg/Kg.  $SQL = (CRQL) \times (df) / \% \text{ solids}$ , where  $\% \text{ solids} = [100 - \% \text{ moisture}] / 100$ . For inorganic constituents, IDL replaces CRQL.

J = The value is an estimated concentration because one or more of the quality control criteria have not been met. It is included to show that the substance has been qualitatively identified as present in this source.

Shaded samples = The sample met observed release criteria for that hazardous substance.

SWOF-Surface Water Overland Flow/Flood Migration Pathway  
SWOF - Observed Release

<b>Table 4</b> <b>Surface Water Pathway</b> <b>Contaminated Sediment Samples Collected from Jefferson Canal,</b> <b>Star Lake Canal and Molasses Bayou</b>				
<b>Sample Location/ CLP ID</b>	<b>Hazardous Substance</b>	<b>Concentration</b>	<b>[SQL]</b>	<b>Reference</b>
SE-16/ MFGP40 FEY77	Chromium	51 mg/Kg	[2.3]	Ref. 17, pp. 001-007, p. 009, p. 019, p. 036
	Copper	106 mg/Kg	[0.91]	Ref. 17, pp. 001-007, p. 009, p. 019, p. 036
	Benzo(a)anthracene	5600 J $\mu$ g/Kg	[9000]	Ref. 19, pp. 001-009, p. 015, p. 066, p. 148
	Benzo(a)pyrene	3900 J $\mu$ g/Kg	[9000]	Ref. 19, pp. 001-009, p. 015, p. 066, p. 148
	Aldrin	ND	[4.7]	Ref. 19, pp. 001-009, p. 020, p. 130, p. 148
	Aroclor-1254	130 J $\mu$ g/Kg	[92]	Ref. 19, pp. 001-009, p. 020, p. 130, p. 148
SE-19/ MFGP61 FEZ01	Chromium	46 mg/Kg	[2.2]	Ref. 17, pp. 001-007, p. 012, p. 033, p. 036
	Copper	67.1 mg/Kg	[0.89]	Ref. 17, pp. 001-007, p. 012, p. 033, p. 036
	Benzo(a)anthracene	4200 $\mu$ g/Kg	[2900]	Ref. 19, pp. 001-009, p. 019, p. 121, p. 148; Ref. 40, p. 003, p. 020
	Benzo(a)pyrene	3300 $\mu$ g/Kg	[2900]	Ref. 19, pp. 001-009, p. 019, p. 121, p. 148; Ref. 40, p. 003, p. 024
	Aldrin	ND	[3.8]	Ref. 19, pp. 001-009, p. 022, p. 144, p. 148
	Aroclor-1254	50 J $\mu$ g/Kg	[73]	Ref. 19, pp. 001-009, p. 022, p. 144, p. 148
Table 4 continued ...				

ND = Not detected. Concentrations for these constituents were not detected at the reported quantitation limit in sediment samples.

[SQL] = The sample quantitation limit. SQL for metals is mg/Kg, SQL for organics is  $\mu$ g/Kg.  $SQL = (CRQL) \times (df) / \% \text{ solids}$ , where  $\% \text{ solids} = [100 - \% \text{ moisture}] / 100$ . For inorganic constituents, IDL replaces CRQL.

J = The value is an estimated concentration because one or more of the quality control criteria have not been met. It is included to show that the substance has been qualitatively identified as present in this source.

Shaded samples = The sample met observed release criteria for that hazardous substance.

SWOF-Surface Water Overland Flow/Flood Migration Pathway  
SWOF - Observed Release

<b>Table 4</b> <b>Surface Water Pathway</b> <b>Contaminated Sediment Samples Collected from Jefferson Canal,</b> <b>Star Lake Canal and Molasses Bayou</b>				
<b>Sample Location/ CLP ID</b>	<b>Hazardous Substance</b>	<b>Concentration</b>	<b>[SQL]</b>	<b>Reference</b>
SE-26/ MFHM62 FFS44	Chromium	16.6 mg/Kg	[0.40]	Ref. 12, pp. 001-006, p. 011, p. 016, p. 035
	Copper	19.9 mg/Kg	[0.40]	Ref. 12, pp. 001-006, p. 011, p. 016, p. 035
	Benzo(a)anthracene	4200 µg/Kg	[730]	Ref. 13, pp. 001-009, p. 019, p. 028, p. 129
	Benzo(a)pyrene	2900 µg/Kg	[730]	Ref. 13, pp. 001-009, p. 019, p. 028, p. 129
	Aldrin	ND	[3.8]	Ref. 13, pp. 001-009, p. 024, p. 028, p. 164
	Aroclor-1254	ND	[73]	Ref. 13, pp. 001-009, p. 024, p. 028, p. 164
SE-11/ MFGP47 FEY84	Chromium	70.1 mg/Kg	[2.9]	Ref. 17 pp. 001-007, p. 010, p. 024, p. 037
	Copper	143 mg/Kg	[1.1]	Ref. 17, pp. 001-007, p. 010, p. 024, p. 037
	Benzo(a)anthracene	12000 J µg/Kg	[30000]	Ref. 19, pp. 001-009, p. 015, p. 082, p. 150
	Benzo(a)pyrene	9400 J µg/Kg	[30000]	Ref. 19, pp. 001-009, p. 015, p. 082, p. 150
	Aldrin	2.4 J µg/Kg	[5.2]	Ref. 19, pp. 001-009, p. 019, p. 135, p. 150
	Aroclor-1254	ND	[100]	Ref. 19, pp. 001-009, p. 019, p. 135, p. 150
Table 4 continued...				

ND = Not detected. Concentrations for these constituents were not detected at the reported quantitation limit in sediment samples.

[SQL] = The sample quantitation limit. SQL for metals is mg/Kg, SQL for organics is µg/Kg. SQL = (CRQL) x (df) / % solids, where % solids = [100 - % moisture] / 100. For inorganic constituents, IDL replaces CRQL.

J = The value is an estimated concentration because one or more of the quality control criteria have not been met. It is included to show that the substance has been qualitatively identified as present in this source.

Shaded samples = The sample met observed release criteria for that hazardous substance.

SWOF-Surface Water Overland Flow/Flood Migration Pathway  
SWOF - Observed Release

<b>Table 4</b> <b>Surface Water Pathway</b> <b>Contaminated Sediment Samples Collected from Jefferson Canal,</b> <b>Star Lake Canal and Molasses Bayou</b>				
<b>Sample Location/ CLP ID</b>	<b>Hazardous Substance</b>	<b>Concentration</b>	<b>[SQL]</b>	<b>Reference</b>
SE-27/ MFHM60 FFS45	Chromium	33.5 mg/Kg	[0.42]	Ref. 12, pp. 001-006, p. 011, p. 016, p. 034
	Copper	99.5 mg/Kg	[0.42]	Ref. 12, pp. 001-006, p. 011, p. 016, p. 034
	Benzo(a)anthracene	14000 J $\mu$ g/Kg	[27000]	Ref. 13, pp. 001-009, p. 019, p. 028, p. 135
	Benzo(a)pyrene	9900 J $\mu$ g/Kg	[27000]	Ref. 13, pp. 001-009, p. 019, p. 028, p. 135
	Aldrin	ND	[4.6]	Ref. 13, pp. 001-009, p. 024, p. 028, p. 165
	Aroclor-1254	330 J $\mu$ g/Kg	[89]	Ref. 13, pp. 001-009, p. 024, p. 028, p. 165
SE-23/ MFHL31 FFR09	Chromium	26.7 mg/Kg	[0.38]	Ref. 12, pp. 001-006, p. 009, p. 016, p. 026
	Copper	40.0 mg/Kg	[0.38]	Ref. 12, pp. 001-006, p. 009, p. 016, p. 026
	Benzo(a)anthracene	500 J $\mu$ g/Kg	[660]	Ref. 13, pp. 001-009, p. 017, p. 028, p. 099
	Benzo(a)pyrene	360 J $\mu$ g/Kg	[660]	Ref. 13, pp. 001-009, p. 017, p. 028, p. 099
	Aldrin	8.0 $\mu$ g/Kg	[3.4]	Ref. 13, pp. 001-009, p. 023, p. 028, p. 156
	Aroclor-1254	ND	[82]	Ref. 13, pp. 001-009, p. 023, p. 028, p. 156
Table 4 continued ...				

ND = Not detected. Concentrations for these constituents were not detected at the reported quantitation limit in sediment samples.

[SQL] = The sample quantitation limit. SQL for metals is mg/Kg, SQL for organics is  $\mu$ g/Kg.  $SQL = (CRQL) \times (df) / \% \text{ solids}$ , where  $\% \text{ solids} = [100 - \% \text{ moisture}] / 100$ . For inorganic constituents, IDL replaces CRQL.

J = The value is an estimated concentration because one or more of the quality control criteria have not been met. It is included to show that the substance has been qualitatively identified as present in this source. Jv - biased low; J^ - biased high.

Shaded samples = The sample met observed release criteria for that hazardous substance.

SWOF-Surface Water Overland Flow/Flood Migration Pathway  
SWOF - Observed Release

<b>Table 4</b> <b>Surface Water Pathway</b> <b>Contaminated Sediment Samples Collected from Jefferson Canal,</b> <b>Star Lake Canal and Molasses Bayou</b>				
<b>Sample Location/ CLP ID</b>	<b>Hazardous Substance</b>	<b>Concentration</b>	<b>[SQL]</b>	<b>Reference</b>
SE-17/MFHL63	Chromium	40.7 mg/Kg	[0.58]	Ref. 12, pp. 001-006, p. 010, p. 017, p. 030
	Copper	76.6 mg/Kg	[0.58]	Ref. 12, pp. 001-006, p. 010, p. 017, p. 030
	Benzo(a)anthracene	5000 J $\mu$ g/Kg	[9400]	Ref. 13, pp. 001-009, p. 017, p. 030, p. 111
	Benzo(a)pyrene	3300 J $\mu$ g/Kg	[9400]	Ref. 13, pp. 001-009, p. 017, p. 030, p. 111
	Aldrin	ND	[4.8]	Ref. 13, pp. 001-009, p. 023, p. 030, p. 160
	Aroclor-1254	ND	[120]	Ref. 13, pp. 001-009, p. 023, p. 030, p. 160

ND = Not detected. Concentrations for these constituents were not detected at the reported quantitation limit in sediment samples.

[SQL] = The sample quantitation limit. SQL for metals is mg/Kg, SQL for organics is  $\mu$ g/Kg.  $SQL = (CRQL) \times (df) / \% \text{ solids}$ , where  $\% \text{ solids} = [100 - \% \text{ moisture}] / 100$ . For inorganic constituents, IDL replaces CRQL.

J = The value is an estimated concentration because one or more of the quality control criteria have not been met. It is included to show that the substance has been qualitatively identified as present in this source. Jv - biased low; J^ - biased high.

Shaded samples = The sample met observed release criteria for that hazardous substance.

**NOTE:**

Table 4 indicates that the semivolatile hazardous substances Benzo(a)anthracene and Benzo(a)pyrene do not meet observed release criteria in samples SE-16, SE-11, SE-27 and SE-17. Due to the nature of these samples a high dilution was necessary to perform the analysis. Therefore, the SQL for these hazardous substances is significantly elevated. Analytical results for Benzo(a)anthracene and Benzo(a)pyrene in samples SE-16, SE-11, SE-27 and SE-17 are qualified with a "J" to indicate that although they do not meet observed release criteria, they have been qualitatively identified as present in the samples (Table 4).

SWOF-Surface Water Overland Flow/Flood Migration Pathway  
SWOF - Observed Release

**Table 5**  
**Surface Water Pathway**  
**Data Usability for Sediment Samples**

Sample Location / CLP ID	Hazardous Substance	Concentration [SQL] ug/Kg	Bias	Bias Correction Calculation (Ref. 41)	Release Concentration Corrected for Bias	Usable as a Release Value?
SE-16 / FEY77	Aroclor-1254	130 J [92]	Unknown	$130 \div 10$	13	No (<SQL)
SE-32 / MFGQ20	Chromium	134 J [0.47]	Unknown	$134 \div 1.29$	103.87	Yes
SE-27 / FFS45	Aroclor-1254	330 J <sup>^</sup> [89]	High	$330 \div 10$	33	No (<SQL)
SE-37 / FEY13	Aldrin	35 J [3.5]	Unknown	$35 \div 14.26$	2.5	No (<SQL)
SE-38 / FEY08	Aldrin	3.7 J [2.8]	Unknown	$3.7 \div 14.26$	0.25	No (<SQL)
SE-39 / FEY09	Aldrin	12 J [6.8]	Unknown	$12 \div 14.26$	0.84	No (<SQL)
	Aroclor-1254	430 J <sup>^</sup> [130]	Unknown	$430 \div 10$	43	No (<SQL)

ND = Not detected.

[SQL] = The sample quantitation limit. SQL for metals is mg/Kg, SQL for organics is  $\mu\text{g/Kg}$ .  $\text{SQL} = (\text{CRQL}) \times (\text{df}) / \% \text{ solids}$ , where  $\% \text{ solids} = [100 - \% \text{ moisture}] / 100$ . For inorganic constituents, IDL replaces CRQL.

J = The value is an estimated concentration because one or more of the quality control criteria have not been met. It is included to show that the substance has been qualitatively identified as present in this source. Jv - biased low; J<sup>^</sup> - biased high.

SWOF-Surface Water Overland Flow/Flood Migration Pathway  
SWOF - Observed Release

Attribution:

The constituents found in the sediment samples, qualifying as observed releases, can be attributed to numerous local chemical manufacturing facilities that discharged industrial wastewater into the Jefferson Canal and Star Lake Canal. Many of the hazardous substances detected in sediment samples appear on discharge permits of the individual facilities (Ref. 21, pp. 001-0032, Ref. 22, pp. 001-003, Ref. 23, pp. 001-037, Ref. 24, pp. 001-036, Ref. 25, pp. 001-008, Ref. 26, pp. 001-013, Ref. 27, p. 001, Ref. 28, pp. 001-019, Ref. 29, pp. 001-010, Ref. 30, pp. 001-028, Ref. 31, pp. 001-007, Ref. 32, pp. 001-002, Ref. 33, pp. 001-002, Ref. 34, pp. 001-005).

Hazardous Substances Released:

Chromium  
Copper  
Benzo(a)anthracene  
Benzo(a)pyrene  
Aldrin  
Aroclor-1254

### 4.1.3 HUMAN FOOD CHAIN THREAT

#### 4.1.3.1 HUMAN FOOD CHAIN THREAT - LIKELIHOOD OF RELEASE

A release of hazardous substances to the surface water pathway has been documented by chemical analysis.

Likelihood of Release Value = 550

#### 4.1.3.2 HUMAN FOOD CHAIN THREAT WASTE CHARACTERISTICS

##### 4.1.3.2.1 TOXICITY/PERSISTENCE/BIOACCUMULATION

<b>Table 6</b> <b>Surface Water Pathway</b> <b>Hazardous Substance Toxicity, Persistence and Bioaccumulation Potential</b>						
<b>Hazardous Substance</b>	<b>Source Number</b>	<b>Toxicity Factor Value*</b>	<b>Persistence Factor Value*</b>	<b>Bioaccum. Potential Factor Value*</b>	<b>Tox/Per/Bio Factor Value</b>	<b>Reference</b>
Chromium	1	10000	1	500	$5 \times 10^6$	1; 2, p. B5
Copper	1	None	1	50000	N/A	1; 2, p. B6
Benzo(a)anthracene	1	1000	1	50000	$5 \times 10^7$	1; 2, p. B2
Benzo(a)pyrene	1	10000	1	50000	$5 \times 10^8$	1; 2, p. B2
Aldrin	1	10000	1	50000	$5 \times 10^8$	1; 2, p. B1
Aroclor-1254	1	10000	1	50000	$5 \times 10^8$	1; 2, p. B16

\*Note: Factor values for each hazardous substance were obtained from the Superfund Chemical Data Matrix (SCDM) 1996. "River" was the predominant surface water body type used to determine the persistence factor value. Bioaccumulation factor (BCF) data are available in SCDM for both fresh water and salt water for the hazardous substances evaluated at this site. Reference 37 of this documentation record designates HRS qualifying wetlands on either side of the Neches River, downstream of its confluence with Star Lake Canal, as "estuarine." Therefore, the salinity category that yielded the highest BCF factor value was used to assign SCDM factor values for each hazardous substance (Ref. 1, Sec. 4.1.3.2.1, p. 51617).

According to the Hazard Ranking System, Benzo(a)pyrene, Aldrin, and Aroclor-1254 are the substances with the highest Toxicity/Persistence/Bioaccumulation Factor Value.

Toxicity/Persistence/Bioaccumulation Factor Value =  $5 \times 10^8$

#### 4.1.3.2.2 HAZARDOUS WASTE QUANTITY

Table 7 Surface Water Pathway Hazardous Waste Quantity		
Source Number	Source Hazardous Waste Quantity Value (Ref. 1, Sec. 2.4.2.1.5)	Is Source Hazardous Constituent Quantity data complete? (yes/no)
1	> 0 but unknown	no
Sum of Values:	> 0 but unknown	

The sum of the source hazardous waste quantity values is assigned as the Hazardous Waste Quantity Factor Value (Ref. 1, Section 2.4.2.2). The sum of the source hazardous waste quantity values for the Jefferson Canal rounded to the nearest integer, is > 0 but unknown. Because there are wetlands subject to Level II concentrations within the 15-mile TDL, the Hazardous Waste Quantity Factor Value receives a default value of 100 (Ref. 1, Section 2.4.2.2, p. 51592).

Hazardous Waste Quantity Factor Value = 100

#### 4.1.3.2.3 HUMAN FOOD CHAIN THREAT - WASTE CHARACTERISTICS FACTOR CATEGORY VALUE

The Human Food Chain Threat Waste Characteristics Factor Category Value is equal to the product of the Hazardous Waste Quantity Factor Value (100), Toxicity Factor Value (10,000), Persistence Factor Value (1), subject to a maximum value of  $1 \times 10^8$ , multiplied by the Bioaccumulation Potential Factor Value (50,000) subject to a maximum value of  $1 \times 10^{12}$ .

$$100 \times 10,000 \times 1 \times 50,000 = 5 \times 10^{10}$$

Human Food Chain Threat Waste Characteristics Factor Category Value = 320  
(Ref. 1, Table 2-7, Section 2.4.3.1)

**4.1.3.3 HUMAN FOOD CHAIN THREAT - TARGETS**

No Level I or Level II observed releases were documented in the Neches River/Sabine Lake fishery.

**4.1.3.3.1 FOOD CHAIN INDIVIDUAL**

The Neches River and Sabine Lake are documented fisheries (Ref. 35, p. 37, pp. 50-54). A portion of the Sabine Lake fishery lies within the 15 mile TDL for this site (Figure 5). Therefore, a value of 20 is assigned to the Food Chain Individual Factor Value (Ref. 1, Section 4.1.3.3.1, p. 51620).

Food Chain Individual Factor Value = 20

**4.1.3.3.2 POPULATION**

The Population Factor Value was not scored because of its minimal impact on the site score.

**4.1.3.3.3 CALCULATION OF HUMAN FOOD CHAIN THREAT - FACTOR CATEGORY VALUE**

Sum of Food Chain Individual + Population Factor Value = 20

**4.1.3.4 CALCULATION OF HUMAN FOOD CHAIN THREAT SCORE FOR A WATERSHED**

The Human Food Chain Threat for a Watershed is equal to the product of the Human Food Chain Threat Factor Category Values for Likelihood of Release (550), Waste Characteristics (320) and Targets (20), divided by 82,500 and subject to a maximum value of 100.

$$\frac{550 \times 320 \times 20}{82,500} = 42.67$$

#### 4.1.4 ENVIRONMENTAL THREAT

##### 4.1.4.1 ENVIRONMENTAL THREAT - LIKELIHOOD OF RELEASE

A release of hazardous substances to the surface water pathway has been documented by chemical analysis.

Likelihood of Release Value = 550

##### 4.1.4.2 ENVIRONMENTAL THREAT - WASTE CHARACTERISTICS

##### 4.1.4.2.1 ECOSYSTEM TOXICITY/PERSISTENCE/BIOACCUMULATION

Table 8 Surface Water Pathway Hazardous Substance Ecosystem Toxicity, Persistence and Bioaccumulation Potential						
Hazardous Substance	Source Number	Ecosystem Toxicity Factor Value*	Persistence Factor Value*	Ecosystem Bioaccum. Potential Factor Value*	Ecosystem Tox/Per/Bio Factor Value	Reference
Chromium	1	100	1	500	$5 \times 10^4$	1; 2, p. B5
Copper	1	100	1	50000	$5 \times 10^5$	1; 2, p. B6
Benzo(a)anthracene	1	10000	1	50000	$5 \times 10^8$	1; 2, p. B2
Benzo(a)pyrene	1	10000	1	50000	$5 \times 10^8$	1; 2, p. B2
Aldrin	1	10000	1	50000	$5 \times 10^8$	1; 2, p. B1
Aroclor-1254	1	10000	1	50000	$5 \times 10^8$	1; 2, p. B16

\*Note: Factor values for each hazardous substance were obtained from the Superfund Chemical Data Matrix (SCDM) 1996. "River" was the predominant surface water body type used to determine the persistence factor value. Bioaccumulation factor (BCF) and ecosystem toxicity data are available in SCDM for both fresh water and salt water for the hazardous substances evaluated at this site. Reference 37 of this documentation record designates the HRS qualifying wetlands on either side of Molasses Bayou as "estuarine." Therefore, the salinity category that yielded the highest BCF and ecosystem toxicity factor values was used to assign SCDM factor values for each hazardous substance (Ref. 1, Sec. 4.1.4.2.1, p. 51621).

According to the Hazard Ranking System, Benzo(a)anthracene, Benzo(a)pyrene, Aldrin and Aroclor-1254 are the substances with the highest Ecosystem Toxicity/Persistence/Bioaccumulation Factor Value.

Ecosystem Toxicity/Persistence/Bioaccumulation Factor Value =  $5 \times 10^8$

## 4.1.4.2.2

**HAZARDOUS WASTE QUANTITY**

Table 9 Surface Water Pathway Hazardous Waste Quantity		
Source Number	Source Hazardous Waste Quantity Value (Ref. 1, Sec. 2.4.2.1.5)	Is Source Hazardous Constituent Quantity data complete? (yes/no)
1	> 0 but unknown	no
Sum of Values:	> 0 but unknown	

The sum of the source hazardous waste quantity values is assigned as the Hazardous Waste Quantity Factor Value (Ref. 1, Section 2.4.2.2). The sum of the source hazardous waste quantity values for the Jefferson Canal rounded to the nearest integer, is > 0 but unknown. Because there are wetlands subject to Level II concentrations within the 15-mile TDL, the Hazardous Waste Quantity Factor Value receives a default value of 100 (Ref. 1, Section 2.4.2.2, p. 51592).

Hazardous Waste Quantity Factor Value = 100

## 4.1.4.2.3

**ENVIRONMENTAL THREAT - WASTE CHARACTERISTICS  
FACTOR CATEGORY VALUE**

The Environmental threat Waste Characteristics Factor Category Value is equal to the product of the Hazardous Waste Quantity Factor Value (100), Ecosystem Toxicity Factor Value (10,000), Persistence Value (1), subject to a maximum value of  $1 \times 10^8$ , multiplied by the Ecosystem Bioaccumulation Potential Factor Value (50,000) subject to a maximum value of  $1 \times 10^{12}$ .

$$100 \times 10,000 \times 1 \times 50,000 = 5 \times 10^{10}$$

Environmental Threat Waste Characteristics Factor Category Value = 320  
(Ref. 1, Table 2-7, Section 2.4.3.1)

#### **4.1.4.3 ENVIRONMENTAL THREAT TARGETS**

##### **4.1.4.3.1 SENSITIVE ENVIRONMENTS**

###### **4.1.4.3.1.1 LEVEL I CONCENTRATIONS**

No Level I concentrations exist for this site.

###### **4.1.4.3.1.2 LEVEL II CONCENTRATIONS**

Wetlands along the hazardous substance migration route are habitats known to be used by the White-faced Ibis, a Texas designated threatened species (Ref. 36, p. 001). This yields a sensitive environment rating value of 50 (Ref. 1, Table 4-23, p. 51624).

Approximately 3.1 miles (Ref. 37) of HRS qualifying wetlands (E2EM1P - estuarine intertidal emergent persistent irregularly flooded; PEM1C - palustrine emergent persistent seasonally flooded) lie along the hazardous substance migration path/Level II segment (Ref. 38, Highlight A-8, p. A-22). This yields a wetland rating value of 100 (Ref. 1, Table 4-24, p. 51625). Distance was measured with an Alvin model #1112 map wheel; National Wetlands Inventory map scale: 1 inch = 2000 feet.

Level II Concentrations =  $50 + 100 = 150$

NOTE: Approximately 0.56 miles of HRS qualifying wetlands were identified along the hazardous substance migration route during the SSI. Subsequent sampling during the ESI increased the length of HRS qualifying wetlands along the hazardous substance migration route.

###### **4.1.4.3.1.3 POTENTIAL CONTAMINATION**

Since Level II concentrations have been documented above, any value for potential wetland contamination would not significantly affect the site score. Therefore, potential contamination is not scored.

**4.1.4.3.1.4                    CALCULATION OF ENVIRONMENTAL THREAT - TARGETS  
FACTOR CATEGORY VALUE**

The Environmental Threat - Targets Factor Category Value is equal to the sum of the values for Level I concentrations, Level II concentrations and potential contamination.

Environmental threat - Targets Factor Category Value =  $0 + 150 + 0 = 150$

**4.1.4.4                            CALCULATION OF ENVIRONMENTAL THREAT SCORE FOR A  
WATERSHED**

The Environmental Threat Score for a Watershed is equal to the product of the Environmental Threat Factor Category Values for Likelihood of Release (550), Waste Characteristics (320) and Targets (150), divided by 82,500, subject to a maximum value of 60.

$$\frac{550 \times 320 \times 150}{82,500} = 320 = 60$$

## **5.0 SOIL EXPOSURE PATHWAY**

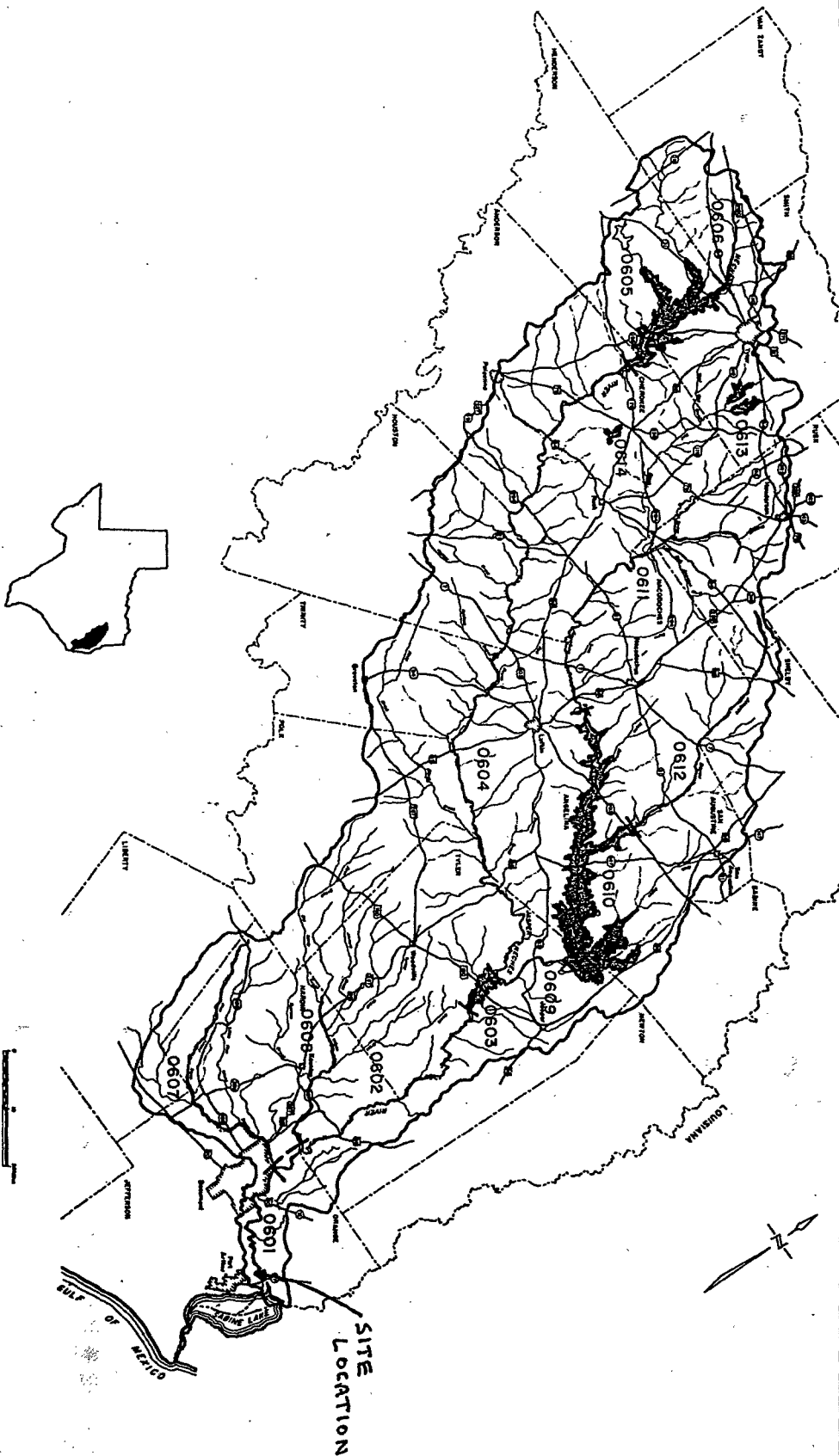
### **5.1.1 OBSERVED RELEASE**

The Soil Exposure Pathway was not scored.

**6.0 AIR MIGRATION PATHWAY**

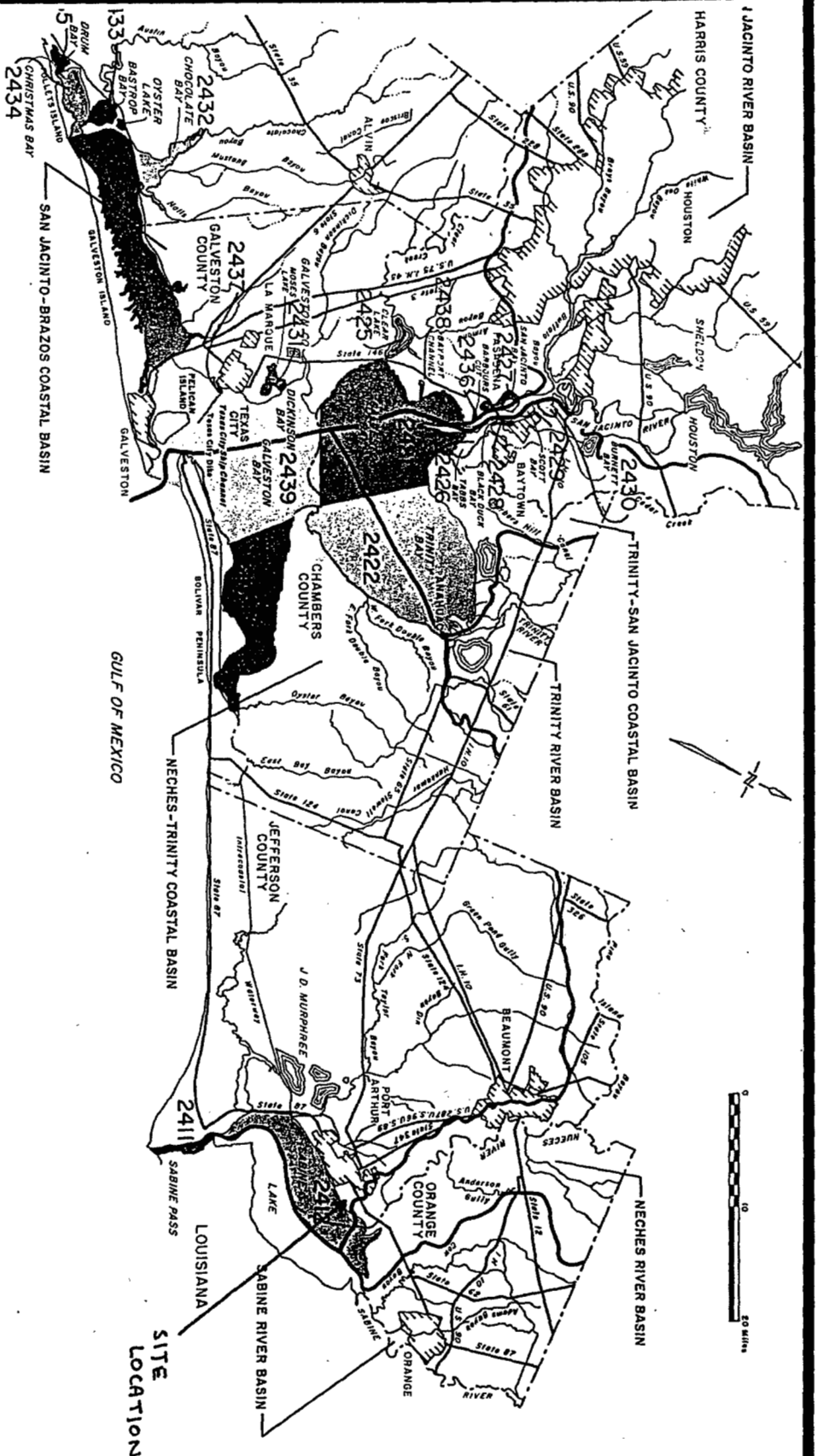
**6.1.1 OBSERVED RELEASE**

The Air Migration Pathway was not scored.



**Figure 3**  
**Segment 0601 of the**  
**Neches River Basin**  
 (Ref. 8, p. 333)

**Star Lake Canal, a.k.a. Jefferson Canal**  
**Port Neches, Jefferson County, Texas**  
**TX0001414341**



**Figure 4**  
**Segment 2412**  
**of the Bays**  
 (Ref. 9, p. 361)

**Star Lake Canal, a.k.a. Jefferson Canal**  
**Port Neches, Jefferson County, Texas**  
 TX0001414341